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in measured and dignified language much that is good to know and to remember in connection with the life-work of one of the torch-bearers of science, but there is one respect in which we would like to have been told more. Zittel as a teacher, text-book writer, ardent collector and museum administrator, Zittel as an investigator thirsting for scientific discovery — in all these capacities he is presented to us; but enough has not yet been said in regard to him as a philosopher, as a theorizer upon the vast store of empirical knowledge of which he was the possessor. He was an excellent systematist, and the faculty of coördination was developed in him to a remarkable degree. Though he discovered no new laws of natural history, yet he had faith in the discovery of others, and he believed in certain principles and methods of drawing philosophical conclusions, as sincerely as he disbelieved in certain others, nor did he always insist upon his own personal judgment, often deferring to the opinions of colleagues in whom he had confidence. On such matters as these we should eagerly welcome more light.

BOTANY.

Maple Sap Flow.[1]— This paper, by Messrs. Jones, Edson, and Moore, and edited by J. H. Hills, Director of the Agricultural Experiment Station of Vermont, is unusual in two ways. It is a very good paper, giving the carefully considered results of experiment and observation sufficiently extended to justify general conclusions. In the second place the paper is unusual for it is the first on this subject since Clark's papers in 1873 and 1874.[2] As I have said elsewhere,[3] it is surprising that American botanists at the Agricultural Experiment Stations in the states where maple-syrup and maple-sugar making is an important industry have not carefully studied the phenomena, at least from an economic standpoint. The present paper is written both from the economic and from the physiological standpoint, and the plant physiologist will find in it data which he has long wished to have. The paper is of such length (184 pages, 8vo) that even an abstract may easily be too long for this journal.

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[1] *Bulletin Vermont Agric. Exp. Station*, No. 103, Dec., 1903.

[2] *Report Mass. Agric. Coll.*, 1873-4; *Report Mass. State Bd. Agric*, No. 22, 1874.

[3] *Text Book of Plant Physiology*, 1903.

After an introduction, stating the importance of the maple-sugar industry, the process of sugar-making, and former investigations, the authors proceed to describe their plan of work and the scope of their investigations. A few pages are given to the structure and general physiology of the maple. In sixty pages the authors discuss (1) the water and gas contents of the maple at different seasons, comparing it with other trees; (2) pressure, positive and negative, at different seasons, in different parts of the tree, and the direction of pressure and sap movement; (3) temperatures, comparing internal with external. It is to be hoped that this study of external temperatures will be supplemented by further ones. The authors studied only air temperatures, but it is obvious that the temperatures of the soil must have at least an equal, if not a greater, bearing on the phenomena of sap flow in the spring than the air temperatures. As others have shown, the roots begin to be active much earlier than the aërial parts of trees and shrubs growing in the temperate zone. This early resumption of active life in the roots, and the energetic absorption of water from the soil, depend more directly on soil temperatures than on air temperatures. Hence, if we are thoroughly to understand the process of periodic sap flow, we must know all the conditions, not merely those in the air and in the aërial parts of a tree. It may not be too much to suggest also that studies of the water-content of soil and air before, during, and after sugaring time would be a valuable addition. This is intimated by the authors, though the subject is not pursued further.

The remaining seventy pages are occupied by a discussion of economic problems and by tabular reports of weather conditions, etc.

G. J. P.

The Journals.— *The Botanical Gazette*, May:— Sargant, "The Evolution of Monocotyledons"; Smith, "The Nutrition of the Egg in Zamia"; Opperman, "A Contribution to the Life History of Aster"; Cardot and Thériot, "New or Unrecorded Mosses of North America"; Livingston, "Physical Properties of Bog Water"; Rose, "William M. Canby"; Ramaley, "Anatomy of Cotyledons."

The Bryologist, May:—Grout, "The Peristome—VI"; Holzinger, *Rhacomitrium Flettii*, n. sp."; Holzinger, "A Bryologist's Glimpse into Geological History"; Harris, "Lichens — Collema and Lepto-